A Synopsis on

SUSTAINABLE APPROACH FOR THE DESIGN AND SYNTHESIS OF SOME MICHAELACCEPTORS DERIVED POTENTIALLY BIOACTIVE HETEROCYCLIC SYSTEMS

For

Partial fulfilment of Ph. D. Degree in Chemistry

SUBMITTED BY

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OUTLINE OF PROPOSED RESEARCH WORK

1. Name of Scholar	**Ms. Ahanthem Priyanca Devi**
2. Title of the Research	**SUSTAINABLE APPROACH FOR THE DESIGN AND SYNTHESIS OF SOME MICHAEL ACCEPTORS DERIVED POTENTIALLY BIOACTIVE HETEROCYCLEIC SYSTEMS**
3. Location:	
a) Organisation/Department where the work is to be done:	**Department of Chemistry** **School of Sciences (SOS)** **Mody University of Science and Technology, Lakshmangarh (Raj.)**
b) Geographical Area of Investigation If any:	**Not-Application**

4. Importance of proposed investigation:

Since last two centuries, continual improvements in organic transformations and synthesis contributed inconceivably to chemical preparing efficiencies by using cost effective synthetic synthons and catalysts have added to certain aspects of greenness.

Various field of chemistry requires different greener pathways in mission toward accomplishing sustainability. Green chemistry have prompted advancement of cleaner measures as options in contrast to traditional synthetic processes and transformations by means of more up to date ideas, like atom economy and E-factor. Green chemistry has

become an important tool in the field of synthetic chemistry. The development of green chemistry redefines the role of a solvent "An ideal solvent facilitates the mass transfer but does not dissolve". In addition, a desirable green solvent should be natural, nontoxic, cheap and readily available with additional benefits of aiding the reaction, separation or catalyst recycling. Solvents like water, has critical significance being harmless, effectively recoverable and lowering saving of unwanted wastage of energy. Other recoverable solvents like $(CH_3)_2CO$, methanol, and ethanol include under green synthetic substances.

5. Objectives of the proposed study:

- To synthesize Michael acceptors (chalcones) by using conventional and non-conventional methods.
- To explore the cyclization of chalcones to various bioactive heterocycles using suitable reagents by sustainable approaches.
- Purification and characterisation of synthesized compounds.
- To carry out possible pre-clinical trials of synthesized compounds via *in vitro/in silico.*

Heterocycles form by far the largest of classical divisions of organic chemistry and are of immense importance biologically and industrially. About one half of over six million compounds recorded in chemical abstracts are heterocyclic [1,2]. Heterocyclic chemistry is one of the most complex and intriguing branch of organic chemistry and heterocyclic compounds constitute the largest and most varied family of organic compounds. Many broader aspects of heterocyclic chemistry are recognized as disciplines of general significance that impinge on almost all aspects of modern organic chemistry, medicinal chemistry and biochemistry [3]. Heterocyclic compounds offer a high degree of structural diversity and have proven to be broadly and economically useful as therapeutic agents [4,5]. The majority of pharmaceuticals and biologically active agrochemicals are heterocyclic while countless additives and modifiers used in industrial applications ranging from cosmetics, reprography, information storage and plastics are heterocyclic in nature [6-8]. One striking structural feature inherent to heterocycles, which continue to be exploited to great advantage by the drug industry, lies in their ability to manifest substituents around a core scaffold in defined three dimensional representations [9,10]. The presence of heterocycles in all kinds of organic compounds of interest in electronics, biology, optics, pharmacology, material sciences and so on is very well known[11].

Chalcones have occupied unique place in medicinal and biological chemistry due to their diverse pharmacological properties such as anticancer [12], anti-inflammatory [13], antiviral [14], antibacterial [15] etc. In addition to their medicinal and pharmaceutical applications, they have also been used as light stabilising agent [16], sweetening agents [17], analytical reagent for amperometric estimation of copper [18], spectrophotometric study of germanium [19], and as synthetic reagent for the synthesis of heterocyclic compounds of biodynamic behaviors [20-22].

A large number heterocyclic derivatives of chalcones are reported which includes benzofuran [23], flavonoids [24], aziridine [25,26], benzothiazepine [27,28] which are used to synthesize several derivatives like cyanopyridines, pyrazolines isoxazoles and pyrimidines having different heterocyclic ring systems [29-32] which possesses a wide range of different biological activities. Heterocycles have been reported to a key structural in medical chemistry and also they are frequently found in large percent in biomolecules such as enzyme, vitamins, natural products and biological active compounds including antifungal [33], antioxidant [34], anticonvulsant [35], antiallergic [36], herbicidal activity [37].

6. Research gaps identified in the proposed field of investigation:

In recent years the use of microwave heating in synthesis of organic compounds become a new trend because most of the thermally driven organic chemicals reactions can be accelerated by microwave. Using such non-conventional reaction has advantages of increase yield, short reaction time, selectivity in reaction, cleaner reaction, ease of reaction work up and eco- friendliness as compared to conventional reaction. Thus, microwave assisted synthesis become a part of green chemistry [38-41] as the developed procedures are both environmentally and economically acceptable.

7. Research Methodology:

- **Hypotheses to be tested:** Not applicable
- **Sources of information:** Chemical Abtracts, Current Contents, Journal, Internet, etc.
- **Tools and Techniques of Research:** Spectrophotometry will be used to observe the spectral data of synthesized heterocycle compounds.

8. Tentative Chapterization:

Chapter I – It will include an extensive literature survey, synthesis and characterization of novel substituted chalcones via MCR methods.

Chapter II- An expeditious one-pot synthesis of 1,5-benzothiazepines.

Chapter III- A facile one-pot synthesis of 2-substituted benzlidene-1-benzofuran-3(2H)-ones.

Chapter IV- An efficient one-pot synthesis of substituted 1,3,5-triaryl-2-pyrazolines.

Chapter V- Synthesis of some new 2-aminobenzene-1,3-dicarbonitrile derivatives.

Chapter VI- Biological assay

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